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(54) **IMAGE DISPLAY CONTROLLERIMAGE DISPLAY SYSTEM AND METHOD FOR DISPLAYING IMAGE DATA**

(57)Abstract:
PROBLEM TO BE SOLVED: To flexibly cope with various three-dimensional display devices which are different stereo image systems.
SOLUTION: When the request packet of a data list is received and a list request is receivedthe response packet is returned (S1 to S3). When a data request is given later3D data is retrieved and is read (S4 to S9). Display device informationincluded in the data requestis converted into image generation information (S10). When the data request is not the request of a VRML systema rendering processing is performedbased on viewpoint information and picture generation information and a 3D scene is generated (S11 to S12). Thenit is converted into a desired stereo image system of a data system (S13)and image data is transmitted to a client side (S14).

CLAIMS

[Claim(s)]
[Claim 1]A picture display control device which is provided with the following and characterized by said display image creating means generating a display image in an image format according to device information acquired by said device information acquisition means.
A display image creating means which generates a display image from three

dimensional image data.
A device information acquisition means which acquires device information of a display.

[Claim 2]The picture display control device according to claim 1 provided with a data management means which manages said three dimensional image data.
[Claim 3]The picture display control device according to claim 1 provided with a data acquisition means which acquires said three dimensional image data from an external instrument.
[Claim 4]The picture display control device according to any one of claims 1 to 3 which is provided with the following and characterized by said display image creating means having a rendering means which performs rendering processing to said three dimensional image data based on said image generating information and said view informationand generates a display image.
A conversion method which changes into image generating information device information acquired by said device information acquisition means.
A view information acquisition means which acquires view information of a display.

[Claim 5]The picture display control device according to claim 4wherein a display image generated by said rendering means is a stereoscopic picture for a corporal vision.
[Claim 6]The picture display control device according to claim 5wherein said stereoscopic pictures are two view images.
[Claim 7]The picture display control device according to claim 4wherein a display image generated by said rendering means is one view image.
[Claim 8]The picture display control device according to any one of claims 1 to 3wherein said display image creating means acquires a three-dimensional scene as a direct presentation picture from said three dimensional image data.
[Claim 9]The picture display control device according to any one of claims 1 to 8wherein a type of devicescreen sizescreen resolutiona data formatthe optimal observation distanceand maximum-permissible azimuth difference are contained in said device information at least.
[Claim 10]A picture display control device comprising:
A device information management tool which manages device information of a display.
An image data acquiring means which acquires image data according to device information managed by said device management tool from an external instrument.

[Claim 11]The picture display control device comprising according to claim 10:
A data management means which manages three dimensional image data.
A transmitting means which transmits said device information and said three dimensional image data to said external instrument.

[Claim 12]The picture display control device according to claim 10 or 11wherein image data acquired from said external instrument is a stereoscopic picture for a corporal vision.
[Claim 13]The picture display control device according to claim 12wherein said stereoscopic pictures are two view images.
[Claim 14]The picture display control device according to claim 10 or 11wherein image data acquired from said external instrument is one view image.
[Claim 15]The picture display control device according to claim 10 or 11wherein image data acquired from said external instrument is three-dimensional scene data.
[Claim 16]The picture display control device according to any one of claims 10 to 15wherein a type of devicescreen sizescreen resolutiona data formatthe optimal observation distanceand maximum-permissible azimuth difference are contained in said device information at least.
[Claim 17]A picture display control device which is provided with the following and characterized by said display image creating means generating a display image according to film information acquired by said film information acquisition means.
A photographing instrument which photos image data.
A device information acquisition means which acquires device information of a display.
A film information acquisition means which acquires film information according to said device information.

[Claim 18]A picture display control device comprising:
A device information management tool which manages device information of a display.
A photographing instrument selecting means which chooses a specific photographing instrument out of two or more photographing instruments.
A transmitting means which transmits said device information and selection information of said photographing instrument to an external instrument.
An image data acquiring means which acquires image data photoed with said specified photographing instrument from said external instrument.

[Claim 19]The picture display control device according to claim 17 or 18wherein image data which said photographing instrument photos is a stereoscopic picture.
[Claim 20]The picture display control device according to claim 19wherein said stereoscopic pictures are two view images.
[Claim 21]The picture display control device according to claim 17 or 18wherein image data which said photographing instrument photos is one view image.
[Claim 22]The picture display control device according to claim 17 or 18wherein image data which said photographing instrument photos is a still picture.
[Claim 23]A display image creating means in which said 2nd picture display control device both generates a display image from three dimensional image data as it is characterized by comprising the followingA picture display systemwherein it has a

device information acquisition means which acquires device information of said display and said display image creating means generates a display image in an image format according to said device information.
A display which displays image data.
The 1st picture display control device it is connected to this display and a user operates.
A device information management tool which it becomes from the 2nd picture display control device that is connected to said 1st picture display control device via a predetermined communications networkand performs predetermined image processing according to a demand from this 1st picture display control device and in which said 1st picture display control device manages device information of said display.
An image data acquiring means which acquires image data according to said device information from said 2nd picture display control device.

[Claim 24]The picture display system according to claim 23wherein said 1st picture display control device was provided with a data management means which manages said three dimensional image data and said 2nd picture display control device is provided with a data acquisition means which acquires said three dimensional image data from said 1st picture display control device.
[Claim 25]The picture display system according to claim 23wherein said 2nd picture display control device is provided with a data management means which manages said three dimensional image data.
[Claim 26]It has a conversion method from which said 2nd picture display control device changes into image generating information device information acquired by said device information acquisition meansand a view information acquisition means which acquires view information of a displayThe picture display system according to any one of claims 23 to 25wherein said display image creating means has a rendering means which performs rendering processing to said three dimensional image data based on said image generating information and view informationand generates a display image.
[Claim 27]The picture display system according to claim 26wherein a display image generated by said rendering means is a stereoscopic picture for a corporal vision.
[Claim 28]The picture display system according to claim 27wherein said stereoscopic pictures are two view images.
[Claim 29]The picture display system according to claim 26wherein a display image generated by said rendering means is one view image.
[Claim 30]The picture display system according to any one of claims 23 to 25wherein said display image creating means acquires a three-dimensional scene as a direct presentation picture from said three dimensional image data.
[Claim 31]The picture display system according to any one of claims 23 to 30wherein a type of devicescreen sizescreen resolutiona data formatthe optimal observation distanceand maximum-permissible azimuth difference are contained in said device

information at least.
[Claim 32]A photographing instrument with which said 2nd picture display control device both picturizes image data as it is characterized by comprising the followingHave a device information acquisition means which acquires device information of said displayand a film information acquisition means which acquires film information according to said device informationand and said display image creating meansA picture display system generating a display image according to film information acquired by said film information acquisition means.
A display which displays image data.
The 1st picture display control device it is connected to this display and a user operates.
A device information management tool which it becomes from the 2nd picture display control device that is connected to said 1st picture display control device via a predetermined communications networkand performs predetermined image pick-up processing according to a demand from this 1st picture display control device and in which said 1st picture display control device manages device information of said display.
A photographing instrument selecting means which chooses a photographing instrument which photos image data from two or more photographing instrumentsA transmitting means which transmits said device information and selection information of said photographing instrument to the 2nd picture display control deviceand an image data acquiring means which acquires image data photoed with said selected photographing instrument from said 2nd picture display control device.

[Claim 33]The picture display system according to claim 32wherein image data which said photographing instrument photos is a stereoscopic picture.
[Claim 34]The picture display system according to claim 33wherein said stereoscopic pictures are two view images.
[Claim 35]The picture display system according to claim 32wherein image data which said photographing instrument photos is one view image.
[Claim 36]The picture display system according to claim 32wherein image data which said photographing instrument photos is a still picture.
[Claim 37]A user operates the 1st picture display control deviceand an acquisition request of image data is emitted to the 2nd picture display control deviceA device information management step in which it is the method of presentation of image data which displays image data obtained by this acquisition request on a displayand said 1st picture display control device manages device information of said displayA display image generation step in which said 2nd picture display control device generates a display image from three dimensional image data including an image data acquisition step which acquires image data according to said device information from said 2nd picture display control deviceThe method of presentation of image data further

characterized by said display image generation step generating a display image in an image format according to said device information including a device information acquisition step which acquires device information of said display.
[Claim 38]The method of presentation of the image data according to claim 37wherein said 1st picture display control device manages said three dimensional image data and said 2nd picture display control device acquires said three dimensional image data from said 1st picture display control device.
[Claim 39]The method of presentation of the image data according to claim 37 with which said 2nd picture display control device is characterized by managing said three dimensional image data.
[Claim 40]A converting step from which said 2nd picture display control device changes said device information into image generating informationView information of three dimensional image data including a view information acquisition step to acquire said display image generation stepThe method of presentation of the image data according to any one of claims 37 to 39 performing rendering processing to said three dimensional image data based on said image generating information and said view informationand generating a display image.
[Claim 41]The method of presentation of the image data according to claim 40wherein a display image generated by performing said rendering processing is a stereoscopic picture for a corporal vision.
[Claim 42]The method of presentation of the image data according to claim 41wherein said stereoscopic pictures are two view images.
[Claim 43]The method of presentation of the image data according to claim 37wherein a display image generated by performing said rendering processing is one view image.
[Claim 44]The method of presentation of the image data according to any one of claims 37 to 39wherein said display image generation step acquires a three-dimensional scene as a direct presentation picture from said three dimensional image data.
[Claim 45]The method of presentation of the image data according to any one of claims 37 to 44wherein a type of devicescreen sizescreen resolutiona data formatthe optimal observation distanceand maximum-permissible azimuth difference are contained in said device information at least.
[Claim 46]The method of presentation of image data which displays on a display image data which a user operated the 1st picture display control deviceemitted a photographing request of image data to the 2nd picture display control deviceand was obtained by this photographing request characterized by comprising the following.
A device information management step in which said 1st picture display control device manages device information of a display.
A photographing instrument selection step which chooses a photographing instrument which photos image data from two or more photographing instruments.
A transmission step which transmits said device information and selection information

of said photographing instrument to the 2nd picture display control device.
A photographing instrument with which said 2nd picture display control device picturizes image data including an image data acquisition step which acquires image data photoed with said selected photographing instrument from said 2nd picture display control device.

[Claim 47]The method of presentation of the image data according to claim 46wherein image data which said photographing instrument photos is a stereoscopic picture.
[Claim 48]The picture display system according to claim 47wherein said stereoscopic pictures are two view images.
[Claim 49]The method of presentation of the image data according to claim 46wherein image data which said photographing instrument photos is one view image.
[Claim 50]The method of presentation of the image data according to claim 46wherein image data which said photographing instrument photos is a still picture

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to a picture display control devicea picture display systemand the method of presentation of image data.
[0002]
[Description of the Prior Art]Medical picturessuch as the formercomputer graphicsCT (ComputeD Tomography)and MRI (Magnetic Resonance Imaging)Although three-dimensional (henceforth "3D") data is treated in molecular modelingtwo-dimensional (henceforth "2D") CAD (Computer Aided Design)and a SAIENTE Fick visualizationAs the display devicethe possible image display device of a three dimentional display may be usedand the image display device using the principle of a ********** binocular vision is already put in practical use in the separate picture which has azimuth difference in both eyes on either siderespectively.
[0003]Generally this kind of image display device gives objective depth visual by using the angle which the look of both eyes makesi.e.the stereoscopic vision function by difference of an angle of convergence.
If small [if an angle of convergence is largeit is nearand]as it senses fara three dimentional display will be carried out.

[0004]There are an on-the-spot photo stereo pair picture of two viewpoints acquired as 2 view image data which uses the principle of such a binocular vision by taking a photograph with the 2 eye camera for stereo image photographya stereo pair picture acquired from 3D model data by carrying out rendering processing from two viewpoints to 2D plane pictureetc.

[0005]As a display type which carries out the three dimentional display of the stereo pair picture of two viewpointsThe HMD (Head Mounted Display) method which a separate liquid crystal panel is made to ** to both eyes on either sideThe liquid crystal shutter method which synchronizes liquid crystal shutter glasses and CRT and displays the picture of the right and left corresponding to right and left eyes by turnsThe solid projector method into which a picture on either side is made to divide by equipping with the polarization eyeglass which projects the picture of polarization which is different by right and leftand has asymmetric polarizationIf it observes from a specific position combining a liquid crystal panel and a lenticular lensvarious display typessuch as a direct viewing type display method glasses-less type which the picture to both eyes dissociates and appearsare already put in practical use.
[0006]Drawing 17 shows the display principle of the image data in the case of displaying by a HMD method.
[0007]That isas shown in drawing 17 (a)the angle of convergence theta of the object 103 as for which a **** case is in a long distance about an object with the right-and-left both eyes 101 and 102 is usually small compared with angle-of-convergence theta' of the object 104 which exists at a short distance.
[0008]Thereforeby arranging the liquid crystal panel 105 for left eyesand the liquid crystal panel 106 for right eyes ahead of the left eye 101 and the right eye 102respectivelyand searching for the projection image of the object 103 and the object 104as shown in drawing 17 (b) when carrying out a three dimentional displayEntering light of the picture as shown in A is carried out to the left eye 101and it is made to carry out entering light of the picture as shown in B to the right eye 102. And as a resultthe liquid crystal panels 105 and 106 are sensed that the objects 103 and 104 exist in the same position as drawing 17 (a) with **** with the right-and-left both eyes 101 and 102. Thusin HMDas the picture of two right and left is carrying out entering light only to one eye on either siderespectivelyit is carrying out the stereoscopic vision indication to it.
[0009]By the wayas mentioned abovethe picture of two right and left carries out entering light only to one eyerespectivelybut since this stereoscopic picture display type has various data formats in a stereo pair picturein order to perform a stereoscopic vision indicationit needs to generate a stereo pair picture as it is also in a data format peculiar to an all directions type.
[0010]Namelyas a data format of a stereo pair pictureFor examplethere are 2 input formsline sequential formpage flipping forman up-and-down display stylea right-and-left display styleVRML (Virtual Reality Modeling Language) formand 2D form.
[0011]The left image L and the right image R are generated independentlyand 2 input forms display themas shown in drawing 18 (a).
As shown in drawing 18 (b)line sequential form takes out the odd line of each pixel of the right image L and the left image Rand an even linerespectivelyand displays the right image L and the left image R side by side by turns for every line.

As shown in drawing 18 (c)page flipping form gives the left image L and the right image R by turns in timeand a table shows them.
As shown in drawing 18 (d)an up-and-down display style arranges perpendicularly what reduced the resolution of the sliding direction of the left image L and the right image R in the halfdisplays it as a picture of one sheetand a right-and-left display styleAs shown in drawing 18 (e)what reduced the resolution of the transverse direction of the left image L and the right image R in the half is arranged horizontallyand it displays as a picture of one sheet.
VRML form displays as a picture what was described by virtual reality model dataand 2D form is displayed as a plane picture two-dimensional as a stereoscopic picture.
[0012]
[The issue which it is going to solve] By the wayalthough it is necessary to generate the stereo pair picture which has the optimal azimuth difference with right-and-left both eyes in the above-mentioned stereoscopic picture display devicethese optimal azimuth difference differs according to a three dimentional display method or screen size.
[0013]Drawing 19 is the lenticular lens known from the former an example of the direct viewing type display as a used stereoscopic picture display deviceand this direct viewing type displayThe 1st and 2nd lenticular lenses 110 and 111 are infixed between the display devices 107such as a liquid crystal display elementand the mask substrate 109 in which the checkered mask pattern 108 was formedand the back light 112 is further arranged behind the mask substrate 109.
[0014]The position which can observe the optimal stereoscopic picture is determined by the size of the 1st and 2nd lenticular lenses 110 and 112 in this kind of direct viewing type display. For exampleon a 15-inch displayit is made optimal to observe a stereoscopic picture in the position which is distant from a screen 60 cm.
[0015]On the other handin HMDan optical design which is shown as a 50-inch display is 2 m ahead on the physically limited spacefor example may be performed. That isalthough the optical distance from an eye to a display screen can take various values depending on an optical designhow to give an angle of convergence according to the method and designed value of a display device anyway differs.
[0016]When the position of the depth direction of an object body changeseven if this is followed and the angle of convergence as a visual function changesthe focus adjustment position as a visual function may always become a display display surface topand may force it a different unnatural corporal vision from the case where an object is actually seen. It may stop namelybeing able to carry out the fusion of the azimuth difference of a right-and-left picture as a solid on a display screen about too large a portion. For examplein the 15-inch direct viewing type display designed see in a 60-cm position from on a display screenabout the object in which the azimuth difference of a picture on either side is set to about 3 cm or more on a screenit is that it is experientially sudden to stop being able to carry out the fusion as a solid. In

HMD designed so that it mighton the other handseem that there are 50 inches 2 m aheadthis value becomes a different thing. That isthe different maximum azimuth difference for every three dimentional display device exists.
[0017]Thussince the stereo image forms of giving the data of a right-and-left picture according to a three dimentional display devicerespectively differConventionallyin the application which carries out rendering processing of the stereo pair pictureand generates it from 3D modelthe application itself outputs in a specific stereo image form depending on a display device. For this reasonthere was a problem that different applications peculiar to a device for every display device could not be used.
[0018]Since the optimal azimuth difference changes according to a three dimentional display device with differences in screen size or a method even if it is a case where the same application can be usedsince stereo image form is the sameVarious parameters had to be manually set as the suitable preset value according to a display device by the application sideand there was a problem that operation was complicated.
[0019]According to the stereo image form of a display deviceor screen size and the distance to a photographic subjectthe optimal base length (distance between lenses of a 2 eye camera) and ******** exist also about the case where the three dimentional display of the image data photoed with the 2 eye camera for stereo photographing is carried out to various kinds of display devices on the other hand. For this reasonaccording to the kind of display deviceor the characteristic and the distance to the photographic subject to photothe user had to adjust said base length and an angle of convergence to the optimum value each time depending on experiential skilland there was a problem that it was user-unfriendly.
[0020]Since stereo image forms differ according to a three dimentional display device also when carrying out the three dimentional display of the image data photoed with said 2 eye cameraThere was a problem of once having to carry out form conversion of the picture which incorporated the special hardware corresponding to a display device each timeor was photoedand having to make a display device suit.
[0021]This invention is made in view of such a problemand it aims at providing the picture display control device and picture display system which can be flexibly equivalent to various kinds of stereoscopic display devices with which stereo image forms differand the method of presentation of image data.
[0022]
[Means for Solving the Problem]To achieve the above objectsa picture display control device concerning this inventionFrom three dimensional image datahave a display image creating means which generates a display imageand a device information acquisition means which acquires device information of a displayand said display image creating meansIt is characterized by generating a display image in an image format according to device information acquired by said device information acquisition means (claim 1).
[0023]It is characterized by providing this invention with a device information

management tool which manages device information of a displayand an image data acquiring means which acquires image data according to device information managed by said device management tool from an external instrument (claim 10).
[0024]A photographing instrument with which this invention photos image data and a device information acquisition means which acquires device information of a displayIt has a film information acquisition means which acquires film information according to said device informationand is characterized by said display image creating means generating a display image according to film information acquired by said film information acquisition means (claim 17).
[0025]A device information management tool in which this invention manages device information of a displayA photographing instrument selecting means which chooses a specific photographing instrument out of two or more photographing instrumentsIt is characterized by having a transmitting means which transmits said device information and selection information of said photographing instrument to an external instrumentand an image data acquiring means which acquires image data photoed with said specified photographing instrument from said external instrument (claim 18).
[0026]A display in which a picture display system concerning this invention displays image dataThe 1st picture display control device it is connected to this display and a user operatesIt consists of the 2nd picture display control device that is connected to said 1st picture display control device via a predetermined communications networkand performs predetermined image processing according to a demand from this 1st picture display control deviceSaid 1st picture display control device has a device information management tool which manages device information of said displayand an image data acquiring means which acquires image data according to said device information from said 2nd picture display control deviceand. A display image creating means in which said 2nd picture display control device generates a display image from three dimensional image dataIt is characterized by having a device information acquisition means which acquires device information of said displayand said display image creating means generating a display image in an image format according to said device information (claim 23).
[0027]A display in which this invention displays image data and the 1st picture display control device it is connected to this display and a user operatesIt consists of the 2nd picture display control device that is connected to said 1st picture display control device via a predetermined communications networkand performs predetermined image pick-up processing according to a demand from this 1st picture display control deviceA device information management tool in which said 1st picture display control device manages device information of said displayA photographing instrument selecting means which chooses a photographing instrument which photos image data from two or more photographing instrumentsA transmitting means which transmits said device information and selection information of said photographing instrument to the 2nd picture display control deviceHave an image data acquiring means which

acquires image data photoed with said selected photographing instrument from said 2nd picture display control deviceand. A photographing instrument with which said 2nd picture display control device picturizes image dataHave a device information acquisition means which acquires device information of said displayand a film information acquisition means which acquires film information according to said device informationand and said display image creating meansIt is characterized by generating a display image according to film information acquired by said film information acquisition means (claim 32).

[0028]The method of presentation of image data concerning this inventionA user operates the 1st picture display control deviceand an acquisition request of image data is emitted to the 2nd picture display control deviceA device information management step in which it is the method of presentation of image data which displays image data obtained by this acquisition request on a displayand said 1st picture display control device manages device information of said displayA display image generation step in which said 2nd picture display control device generates a display image from three dimensional image data including an image data acquisition step which acquires image data according to said device information from said 2nd picture display control deviceIt is further characterized by said display image generation step generating a display image in an image format according to said device information including a device information acquisition step which acquires device information of said display (claim 37).

[0029]A user operates the 1st picture display control deviceand this invention emits a photographing request of image data to the 2nd picture display control deviceA device information management step in which it is the method of presentation of image data which displays image data obtained by this photographing request on a displayand said 1st picture display control device manages device information of a displayA photographing instrument selection step which chooses a photographing instrument which photos image data from two or more photographing instrumentsA transmission step which transmits said device information and selection information of said photographing instrument to the 2nd picture display control deviceSaid 2nd picture display control device has a photographing instrument which picturizes image data including an image data acquisition step which acquires image data photoed with said selected photographing instrument from said 2nd picture display control deviceand. A device information acquisition step which acquires device information of said displayIt is further characterized by said display image generation step generating a display image according to said film information film information including a film information acquisition step which acquires film information according to said device information (claim 46).

[0030]Other features of this invention will become clearer than a statement of the following embodiment of the invention.

[0031]

[Embodiment of the Invention]Nextan embodiment of the invention is explained in full detail based on a drawing.
[0032]As for this picture display systemthe 1st and 2nd database clients 1a and 1b and 3D database servers 3 are mutually connected via the network 4 as block configuration figure ** which shows the 1 embodiment of the picture display system which requires drawing 1 for this invention. The 1st and 2nd database clients 1a and 1b The 1st and the 2nd stereoscopic vision indication device. (It is hereafter called a "3D display device") being connected to 5a and 5brespectively -- this -- controlling the 1st and 2nd 3D control devices 5a and 5bthe 1st and 2nd 3D control devices 5a and 5b display that stereoscopic picture data is also by mutually different stereo image format.
[0033]As the 1st and 2nd 3D display devices 5a and 5bVarious kinds of devicessuch as HMDa direct viewing type displaya liquid crystal shutter methodand a solid projectorcan be usedand the network 4 will not be limited in particularif it has sufficient bandwidth to transmit the data mentioned later.
[0034]The communication control part 7 which the 3D database server 3 receives the request packet from the 1st and 2nd database clients 1a and 1b from the network 4and interprets dataThe display device signal transduction part 10 which changes display device information into image generating information3D scene generation part 9 provided with the stereo image data conversion part 8 which changes the generated image data into stereo image formIt has the data management part 11 which saves the data generated by 3D scene generation part 9and rendering processing of the 3D scene data is carried out in the 1st and 2nd database clients 1a and the form of having been most suitable for every 1band it is returned to said 1st or 2nd database client 1a and 1b.
[0035]The 1st and 2nd database clients 1a and 1b are provided with the following.
The communication control parts 12a and 12b which control communication with the 3D database server 3 via the network 4.
The display Management Department 14a and 14b having the device information Management Department 13a and 13b which manages device information.
Viewpoint setting out and the changing parts 15a and 15b which carry out the setting variation of the viewpoint
3D data selection and the indicators 16a and 16b which carry out the list display of the 3D data sceneand choose it

[0036]Drawing 2 is a table showing the list of stereo image formand a predetermined stereo image form is assigned to each format IDEach format ID is written in the data format of a data response packet mentioned laterand the 1st or 2nd database client 1a and 1b is returned from the 3D database server 3.
[0037]Drawing 3 is a packet format of the request packet delivered and received between the 1st and 2nd database clients 1a and 1b and the 3D database server 3and

its response packet.
[0038]Drawing 3 (a) is a list request packetand The 1st or 2nd database client 1aTransmitting the list request 19 from 1b to the 3D database server 3the 1st or 2nd database client 1a and 1b requires a list of 3D data saved at the data management part 11 of the 3D database server 3.
[0039]Drawing 3 (b) is shown and the packet format of the response packet to the list request 19 this response packetTwo or more two or more groups which made the lot data ID22a and the data title 22b of 3D data besides the list response 20 which shows a packet kind are containedand the number of these groups is written in the data number 21. It is saved at the database clients 1a and 1band when publishing the data request packet mentioned laterand acquiring data ID from a data titleit is used so that it may mention later about the contents of the list.
[0040]Although the packet format of a data request packet is shownthis data request packet specifies view information 26 and data ID27 and drawing 3 (c) requires 3D dataIn that casethe display device information 24 on the database clients 1a and 1b and the optimal requested data form 25 for a display are specified.
[0041]To this data request packetfrom the 3D database server 3as shown in drawing 3 (d)the stereo image data by which the rendering was carried out as a data response packet is returned. Under the present circumstancesthe response device information 30the data format 31 (format ID corresponding to the stereo image form of drawing 3)the compression format 32and the stereo image data 33 to data ID29 and display device information are written in. As compression formatarbitrary compression formatsuch as JPEG form and RLE formcan be used.
[0042]Drawing 4 is a format figure of the display device information 24.
[0043]Type-of-device ID is written in the device kind column 34and HMDan accepting-reality displayliquid crystal shutter glassesa polarization projector2D monitoretc. specify a display device by an identifier (ID). The length of the diagonal line of a screen is written in the screen size column 35 per inch. The pixel number beside vertical x is written in the screen resolution column 36for examplein the case of VGA which is a display standard of U.S. IBMit is written in with 640x480. The format ID corresponding to stereo image form is written in the data format column 37.
[0044]The distance from the optimal screen for seeing by 3D is written in the optimal observation distance column 38. Howeverthe optimal observation distance is shown by not a physical distance but optical distance (light path length) in consideration of a case as distance from an eye to a screen is optically lengthened like HMD using prisma mirroretc.
[0045]The allowable maximum of the distance between the corresponding points in which the fusion is possible as a solid is written in the maximum-permissible azimuth difference column 39 with the dot number on a screen on the maximum-permissible azimuth difference in which the corporal vision of a right-and-left picture is possiblei.e.a right-and-left picture. When the azimuth difference of a right-and-left

picture is larger than a dot numberit becomes impossible to carry out the fusion as a solid. they are display overlay important pointssuch as propriety of 2D / 3D changeat the reserve column 40 -- in addition to thisinformation is written in.
[0046]Drawing 5 is a flow chart of the operation procedures performed with the 3D database server 3.
[0047]Receive the request packet of a data list at Step S1and at Step S2 The 1st or 2nd database client 1aWhen it is judged that the list request 19 was received from 1bit progresses to Step S3and it is stored in the data management part 11the list of data ID corresponding to 3D scene data and data titles is extractedand a list response packet is returned to the 1st or 2nd database client 1a and 1b.
[0048]When the answer of Step S2 is denial (No)it progresses to step S4When distinguishing whether the data request packet was receivedand the answer is denial (No)while progressing to Step S5 and performing other processingsIt is judged whether when the answer is affirmation (Yes)3D data stored in the data management part 11 is searched with Step S6and there is any 3D scene corresponding to data ID at continuing Step S7. And when the answer is denial (No)error handling is performed at Step S8and when the answer is affirmation (Yes)3D scene in the data management part 11 is read to 3D scene generation part 9. Subsequentlyin Step S10image generating information is created based on the display device information 24 on a data request packet in the display device signal transduction part 10.
[0049]Image generating information is information required in order to generate the stereo image of two sheets by rendering processingand as shown in drawing 6it consists of the base length 41the angle of convergence 42the generation resolution 43the data format 44 of stereo image datathe shortest object distance 45and the other preliminary information 46. According to this embodimentabout all the 3D display devices which may be usedthe optimal value for changing into image generating information from display device information is table-ized beforehandand is stored in the display device signal transduction part 10. Conversion to the image generating information of display device information is replaced with the above-mentioned table referencethe method of mapping in image generating information is mathematized from the various display device information shown in drawing 2and it may change based on this expression.
[0050]Nextit is judged whether at Step S11the requested data form 25 of a data request packet is demanding VRML formSince the data itself is 3D scene data when VRML form is being demanded (i.e.when demanding 3D data directly)it progresses to Step S14 promptly.
[0051]On the other handwhen the answer of Step S11 is denial (No)it progresses to Step S12rendering processing is performedand 3D scene is generated. That isin 3D scene generation part 9to 3D scene data read by step S9rendering processing is performed based on the view information 26 and described image creation information of a data request packetand the stereo image of two viewpoints is generated.

[0052]Rendering processing specifically arranges a virtual camera all over 3D space where 3D scene datai.e.scene dataexistsand a two-dimensional picture is acquired by photoing 2D space with a camera. In this casein order to carry out rendering processing of the stereo imagesaid virtual camera is formed in two viewpoints on either side. And the view position coordinates and the eye direction in 3D scene are included in the view information 26and the three dimensional position and direction of a virtual camera of [at the time of carrying out a rendering as a stereo image of two viewpoints] are determined as it based on the base length 41 and the angle of convergence 42 of this view information and image generating information.
[0053]That isif it uses representing the position of the object 47 used as the candidate for photography with the point O like as shown in drawing 7and the view position included in view information is made into the point Can eye direction is set to CO and it is the base length D and the angle of convergence thetaa rendering will be carried out noting that the position of the point A and the point B has two virtual cameras. That isthe camera of the point A and the point B turns to the direction of the point Orespectivelyit is arrangedthe middle point of the point AB is the point Cand it is set to theta=**AOB**AOC=** BOC=theta / 2. If the level surface of 2D space is made into an XY planethe Z coordinate of the point A and the point B will become the point C and the same that isand the line segment AB will become the flat surface XY and parallel.
[0054]3D scene which is in short distance from the shortest object distance 45 of image generating information on the occasion of rendering processing has forbidden performing rendering processing about 3D scene which is in short distance from the shortest object distance 45 in order to exceed maximum-permissible azimuth difference. Rendering processing is forbidden and also as for making it not conspicuous [the maximum azimuth difference]it is more preferred about short-distance image data processingto make it translucent etc. than about the shortest object distance 45.
[0055]Nextin the stereo image data conversion part 8 according to the data format 37 of image generating information at Step S13If form conversion of the picture of two sheets which carried out the rendering from two viewpoints is carried out and compression format is specifiedgraphical data compression will be performed and image data will be returned to the 1st or 2nd database client 1a and 1b at Step S14.
[0056]When the data format 37 is line sequential formsince separation of a right-and-left picture comes out vividly and it becomes impossible the time of extensionwhen compression which uses DCT like JPEG is performed as it isIn this caseline rearrangement is performedafter collecting only an even line and odd linesrespectively and changing into a format like a right-and-left display type (refer to drawing 18 (e))it compressesand operation contrary to this is performed at the time of extension.
[0057]Flow chart **** drawing 8 indicates the operation procedures of the database clients 1a and 1b to be.

[0058]At Step S21a list request packet is published to the database server 3Acquire a list of 3D data stored in the data management part 11 at continuing Step S22and display – ** of the data title 22b in the acquired list response packet on 3D data selection and the indicators 16a and 16band. Corresponding data ID is stored in these 3D data selection and indicators 16a and 16b.
[0059]Subsequentlyat Step S23a user's operation is received and it is judged whether the viewpoint was set up and changed by viewpoint setting out and the changing parts 15a and 15b in continuing Step S24. And when the answer is affirmation (Yes)after saving the view information changed at Step S25 at the device information Management Department 13a and 13bit returns to Step S23.
[0060]On the other handwhen the answer of Step S24 is denial (No)a default value is maintainedit progresses to Step S26in – ** tablethe data title 22b is shown in 3D data selection and the indicator 14the data title 22b which a user wants to display is chosenand it is judged whether data display demand operation was performed.
[0061]And when the answer is denial (No)after performing other processings at Step S27While returning to Step S23when the answer of Step S26 is affirmation (Yes)it progresses to Step S28Acquire data ID22a corresponding to the data title 22band at continuing Step S29 The device information Management Department 13aThe display device information 24and viewpoint setting out and the changing part 15a which are saved at 13bRead the view information 26 saved at 15badd this display device information 24 and the view information 26 to the data request 23and a data request packet is createdThis data request packet is published to the database server 3and 3D data is received and acquired from the database server 3 at Step S30 after that.
[0062]Nextacquired 3D data exists in Step S31and it confirms whether be a suitable formWhen the answer is denial (No)while performing error handling at Step S32 and returning to Step S23When the answer is affirmation (Yes)it progresses to Step S33 and image data is taken outand elongation processing is performed if neededand image data is expressed to the 1st or 2nd 3D display device 5a and 5b as Step S34.
[0063]Thusa 1st embodiment the database clients 1a and 1b3D scene of the request stored in the data management part 11 was chosenand if the information about a data formatmaximum–permissible azimuth differenceetc. of the 3D display devices 5a and 5b is added and it requires of the 3D database server 3the 3D database server 3 would carry out rendering processing of the stereo imageand will have returned it. And since the image generating information of the optimal angle of convergencebase lengthetc. is used for every 3D display device 5a and 5b on the occasion of rendering processingit can respond to various different stereo image forms flexiblyand even if a 3D display device is changedit can be coped with easily.
[0064]Drawing 9 is the 1st modification of said 1st embodimentand in this 1st modification. 3D scene generation part 50a provided with the stereo image data conversion part 49a is formed in the 1st database client 48aand the case as this database client 48a has sufficient rendering capability is assumed. In this caseVRML

form is specified as the requested data form 25 to the database server 3and rendering processing from VRML form to a stereo image is performed by the database client 48a side. Thereforethe data which passes the network 4 turns into the VRML data instead of stereo image data by which the rendering was carried out.
[0065]Although the still picture scene was assumedthe above can be similarly performedwhen transmitting the stereo image data 33 (drawing 3 (d)) of a data response packet as stream data of a stereo image also in a video scene. As stream data of a stereo imageyou may treat as a usual animation stream as it is except an up-and-down display type (drawing 18 (d)) and a right-and-left display type (drawing 18 (e)). In the case of a line sequential method (drawing 18 (b))line rearrangement should just be performed like a still picture. What is necessary is to treat as a big picture of one sheet which pasted the picture of two sheets together in the case of 2 input methods (drawing 18 (a)) or a page flipping method (drawing 18 (c))and just to make it divide it into the original form by the received side.
[0066]Even if it is a case where not a three dimentional display device but the usual two-dimensional display device is connectedit can respond by specifying 2D method. In this caseonly viewpoint-position-information itself 1 usual viewpoint should generate the Wren Darin processing.
[0067]the data format which was suitable for the three dimentional display device in 2D scene even if it was a case of three dimentional display devicessuch as holograms other than the device which carries out the three dimentional display of the two view images-- a rendering -- or what is necessary is to change and just to return
[0068]Instead of drawing 10 being the 2nd modification of a 1st embodimentand providing a data management part in the database server 52To the 1st and 2nd database clients 51a and 51bthe data management part 52a52b is provided3D scene data is transmitted to the database server 52 from the 1st or 2nd database client 51a and 51band rendering processing is performed by this 1st or 2nd database client 51a and 51b.
[0069]That isin the 2nd modificationit replaces with a data request packet and a data rendering request packet as shown in drawing 11 is published by the database server 52 from the 1st or 2nd database client 51a and 51b. Namelya data rendering request packetIt comprises the data rendering demand 55the display device information 24the requested data form 25the view information 26and the 3D scene data 59and 3D data selection and the indicators 16a and 16b choose 3D scene data sent out to the database server 52.
[0070]What is necessary is to create the packet of the form which consists of a viewpoint change request and view informationand to send only view information continuously about a video scene.
[0071]Like the 2nd modificationthe 1st or 2nd database client 51aThe display device information which needs 51b for the stereo pair image generation according to a display device is heldWhen carrying out rendering processing of the 3D data

transmitted from this 1st or 2nd database client 51a and 51b with the database server 52 and generating a stereo pair pictureIt changes into stereo image creation information required for stereo image generation from this held display device informationand can respond also to various 3D display devices with which stereo image forms differ flexibly by generating the optimal stereo pair picture. It can also perform load sharing that the database server 52 formed separately is performing rendering processingwithout carrying out rendering processing by the database clients 51a and 51b. Since especially rendering processing has heavy loadif it arranges two or more database servers for rendering processing and is made to carry out rendering processing in search of a database server with low loadIt becomes possible to perform load sharingwithout being conscious of the difference in a display device at the time of a rendering under the environment where various 3D display devices with which stereo image forms differ are connected.

[0072]Nexta 2nd embodiment of this invention is described.

[0073]Drawing 12 is the 1 embodiment of the picture display system concerning this invention a shown system configuration figureand this stereoscopic picture display systemThe 1st and 2nd database clients 60a and 60bthe 1stand 2nd 3D camera server. (It is hereafter called "3D camera server".) 61a and 61b are mutually connected via the network 4Furthermore the 1st and 2nd 3D display devices 5a and 5b are connected to the database clients 60a and 60b of the 1st and 2nd **respectivelyand the 1st and 2nd cameras 62a and 62b for stereo photographing are connected to the 1st and 2nd 3D camera servers 61a and 61b.

[0074]The communication control parts 63a and 63b in which the 3D camera servers 61a and 61b manage interface operation between the networks 4The camera information Management Department 64a and 64b which manages camera informationand the camera control parts 65a and 65b which control the cameras 62a and 62b for stereo photographing based on the camera information of the camera information Management Department 64a and 64bThe image taking-in parts 66a and 66b which incorporate the image photoed with the cameras 62a and 62b for stereo photographingThe data management part 67a which manages the camera information managed at the picture image data incorporated in the image taking-in parts 66a and 66band the camera information Management Department 64ahaving 67b -- the various parameters (base length.) from the cameras 62a and 62b for stereo photographing The picture which set up an angle of convergencefocus informationetc. appropriatelyphotoed themand photoed them according to the demand from the database clients 60a and 60b is compressedand the database clients 60a and 60b are returned.

[0075]The cameras 62a and 62b for stereo photographing consist of two camera lens systemsand have come to be able to carry out the setting variation of base lengthan angle of convergencefocus informationand the zoom magnifying power according to the demand from the camera control parts 65a and 65b.

[0076]Whether zoom is possible whether they are base lengththe setting range of an angle of convergence and lens focal point distanceand auto-focusing (AF) may change with cameras 62a and 62b for stereo photographing. The image data as digital data can be taken out now from the cameras 62a and 62b for stereo photographingrespectively.
[0077]The database clients 60a and 60bThe communication control parts 68a and 68b which manage interface operation between the networks 4The display Management Department 70a and 70b having the display device Research and Data Processing Department 69a and 69bThe camera-settings changing parts 71a and 71b which change camera settingsand the camera selecting part 72a which chooses the desired camera for stereo photographing from two or more cameras for stereo photographingHave 72band the 1st or 2nd 3D display device 5a and 5b is controlledand it controls to elongate and carry out the three dimentional display of the stereo image which transmittedphotoed and gained the request packet to the 3D camera servers 61a and 61b.
[0078]The 3D camera servers 61a and 61b The database client 60aRequest packetssuch as a stereo image demand from 60bare received via the network 4the parameter for various photography is set in the optimal form to every database client 60a and 60band a stereo image is returned.
[0079]Drawing 13 is a packet format of a request packet and a response packet delivered and received between the database clients 60a and 60b and the 3D camera servers 61a and 61b.
[0080]The field which identifies the kind of packet is written in the beginning of each packetand there are four kinds of packet formats as shown in drawing 13 (a) - drawing 13 (d).
[0081]Drawing 13 (a) shows the packet format of a camera capability inquiry request packetThe requested data form 76 of specifying the stereo image form at the time of requiring the transmission source address 74the display device information 75and stereo image which identify the capability inquiry demand [which shows a packet kind] 73and transmitting origin of a request packetand the demand compression format 77 which specifies demand graphical-data-compression form are written in.
[0082]Display device information has the same data format as a 1st embodiment (refer to drawing 4)and the requested data form 76 specifies the stereo image form of drawing 2 by a format ID.
[0083]Drawing 13 (b) shows the packet format of the response packet to a camera capability inquiry demandIt comprises the capability inquiry response 78 which shows a packet kindthe transmission source address 79 which identifies the transmitting origin of a response packetthe response indication 80 which indicates whether camera capability fills a demand by "O.K." and "NG"and the camera-settings scope information 81 which writes in camera ability information.
[0084]As shown in drawing 14camera-settings scope information specificallyThe

minimum of the AF/MF information 93 which writes in focus informationsuch as auto-focusing or manual focusthe shortest object distance information 94 which shows the shortest distance which can be photoedthe maximum zoom magnifying power 95 which writes in the maximum of zoom magnifying powerand zoom magnifying power. The minimum zoom magnifying power 96 and the picture to write in are capturedIt comprises the resolution information 97 which enumerates the resolution of the possible picture at the time of returningthe stereo form information 98 which writes in the stereo image form which can be set up at the time of picture returnthe compression format information 99 in which a possible graphical-data-compression form is writtenand the focal distance information 100 in which the focal distance of a lens is written. In the case of the camera in which zoom is possiblea focal distance in case zoom magnifying power is "1" is written in the focal distance information 100.

[0085]Drawing 13 (c) shows the packet format of an image request packetIt comprises the camera-settings information 83 in which the setting request value of the image request 150 which shows a packet kindthe transmission source address 82 which identifies the transmitting origin of a request packetzoomand a focus is writtenthe requested data form 84 of specifying stereo image formand the demand compression format 85 which specifies graphical-data-compression form.

[0086]Drawing 13 (d) is a packet format of the response packet to an image request packetThe transmission source address 87 which identifies the transmitting origin of the picture response 86 and response which show a packet kindthe data format 88 of image datathe compression format 89 of image datathe zoom value at the time of stereo image photographyThe stereo image data changed into the stereo setup information 91such as the camera-settings informationincluding a focus value etc.90base length at the time of stereo image photographyand an angle of convergencethe above-mentioned data formatand compression format is written in.

[0087]Drawing 15 is a flow chart which shows the operation procedures of the 1st database client 60a. Although a 2nd embodiment explains the operation procedures of the 1st database client 60athe 2nd database client 60b also performs same operation.

[0088]Firstthe database clients' 60a and 60b start of photographing operation will choose whether a user takes a photograph with which 3D camera server on the network 4 by the camera selecting part 72a at Step S41. The address of selectable 3D camera server is beforehand known on the network 4and the 1st 3D camera server 61a is chosen in this embodiment.

[0089]Nextat Step S42display device information is acquired from the display device Management Department 69a. At continuing Step S43a camera capability inquiry request packet is created based on these informationand this camera capability inquiry request packet is transmitted to the 1st 3D camera server 61a. Subsequentlyin Step S44the response packet is received from the 1st 3D camera server 61aAt continuing Step S45the zoom range of the camera 62a for stereo photographingWhen it judges whether change of the focal range and AF/MF setting

out is possibleand the answer is affirmation (Yes)while progressing to Step S48When the answer is denial (No)it progresses to Step S46and it progresses to Step S48after determining a zoom value and a focus value at Step S47 which shows a user the ranges of various parameters which can be set upsuch as zoom magnifying power and focus possible setting outand follows him by the camera-settings changing part 71a. The camera-settings changing part 71a has a user graphical interface (GUI) for various data presentation / setting outand sets it up on a display screen.

[0090]Nextat Step S48an image request packet is generated based on said camera-settings information 90the compression format 89and the data format 87and it publishes to the 3D camera server 61a. And at Step S49receive a picture response packetand stereo image data is elongated at the display Management Department 70a based on the data format 88 and the compression format 89 of a picture response packet at continuing Step S50Subsequentlyat Step S51the three dimentional display of the image data is carried out to the 1st 3D display device 5a. Since the camera-settings information 90 and the stereo setup information 91 at the time of photoing a picture are returned to a picture response packet with said data format 88 and the compression format 89this camera-settings information 90 and the stereo setup information 91 are displayed on the display screen of the camera-settings changing part 71a.

[0091]And at Step S52when it judges whether the user ended operationand the answer is affirmation (Yes)while ending processing as it iswhen the answer is denial (No)it progresses to Step S53and it is judged whether a zoom value and a focus value have change. And when the answer is affirmation (Yes)while returning to Step S45 and repeating above-mentioned processingwhen the answer is denial (No)it returns to Step S48 and above-mentioned processing is repeated.

[0092]Flow chart **** drawing 16 indicates the operation procedures of the 1st 3D camera server 61a to be. Although a 2nd embodiment explains the operation procedures of the 1st 3D camera server 61athe 2nd 3D camera server 61b also performs same operation.

[0093]If the 1st 3D camera server 61a startsafter initializing the data of a zoom valuea focus valuebase lengthan angle of convergenceetc. at Step S61the request packet from the 1st database client 60a will be received at Step S62.

[0094]And it is judged whether the camera capability inquiry request packet was received at Step S63When the answer is affirmation (Yes)incorporate the display device information 75 on a request packetthe requested data form 76and the demand compression format 77 into the camera information Management Department 64aand. The zoom range and the focal range which may change according to the display device information 75 are determinedand the camera-settings scope information 81 is determined. And it judges whether a setting range is "O.K." at Step S65when the answer is affirmation (Yes)the notice of "O.K." is performed at Step S66when the answer is denial (No)the notice of "NG" is performed at Step S67and it returns to

Step S62respectively.
[0095]The camera-settings scope information 81i.e.a zoom rangeand the focal range are determined after also taking into consideration the range of base length which can be set upand the setting range of an angle of convergence with the display device information 75.
[0096]When the answer of Step S63 is denial (No)it progresses to Step S68and it is judged whether the image request packet was received. And when the answer is denial (No)after progressing to Step S69 and performing other processingsWhile returning to Step S62when the answer is affirmation (Yes)it progresses to Step S70The camera-settings information 83the requested data form 84and the demand compression format 85 are read from the camera information Management Department 64aBased on zoom magnifying power and focus informationthe optimal base length and an angle of convergence are computedand the 1st camera 62a for stereo photographing is controlled by Step S71 by the camera control part 65a based on these camera parameters.
[0097]Progress to Step S72 after thisand a stereo image on either side is incorporated as digital data in the image taking-in part 66aAfter setting up the requested data form 84 for the data incorporated at continuing Step S73 by the data management part 67aimage data is compressed according to the demand compression format 85 if needed at Step S74and a picture response packet is returned to the 1st database client 60a at Step S75. In this casethe camera-settings information 90 and the stereo setup information 91 which were taken and were set up at the time of ** are also simultaneously included in a picture response packet.
[0098]Although the optimal angle of convergence and the base length need to match with the focal distance of a cameraor display device information and need to determine from zooming information and focus informationthese correspondence relations -- beforehand -- table-izing -- or it is mathematizedand is stored in the data management part 67aand a desired angle of convergence and base length are called for by the retrieval processing or data processing of a table.
[0099]In a 2nd embodimentthusthe database client 60a60b transmits the display device informationincluding a methoddisplay sizeetc.75 about a three dimentional display device to the 3D camera servers 61a and 61band it in these 3D camera servers 61a and 61b. It changes into stereo photographing informationincluding base length required for stereo photographingan angle of convergenceetc.from the display device information 75Since the image data which set up and carried out stereo photographing of the base length and the angle of convergence of the cameras 62a and 62b for stereo photographingand photoed them based on this stereo photographing information is returned to the database clients 60a and 60bIt can respond to various different stereo image forms flexiblyand even if a 3D display device is changedit can be coped with easily.
[0100]Although the camera for stereo photographing which consists of two camera

systems in a 2nd embodiment is usedFor exampleit will not be limited especially if it is a camera which a camera imaging system is possiblenamelycan take out as a stereo image pair of digital data with devising a lens system one also with the camera for stereo photographing which can be inputted by field alternation for every right and left.
[0101]
[Effect of the Invention]As explained in full detail aboveaccording to this inventionvarious device information required for generation of image data is managedSince desired device information is changed into image generating informationrendering processing of the 3D data is carried out based on view information and image generating information and desired image data is generatedit can respond to various different stereo image forms flexiblyand even if a 3D display device is changedit can be coped with easily.
[0102]Since according to this invention a photographing condition required for picture photography is searched for from this device information and picture photography is carried out by the optimal angle of convergence and base length when holding device information required for picture photography to a 3D display device and photoing image dataIt can respond to various different stereo image forms flexiblyand even if a 3D display device is changedit can be coped with easily.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]It is a system configuration figure showing a 1st embodiment of the stereoscopic picture system concerning this invention.
[Drawing 2]It is a table figure showing stereo image form.
[Drawing 3]It is a packet format figure showing transfer with a database client and 3D database server.
[Drawing 4]It is a format figure of display device information.
[Drawing 5]It is a format figure of image generating information.
[Drawing 6]It is a flow chart which shows the operation procedures of 3D database server.
[Drawing 7]It is a mimetic diagram for explaining rendering processing.
[Drawing 8]It is a flow chart which shows the operation procedures of a database client.
[Drawing 9]It is an important section system configuration figure showing the 1st modification of a 1st embodiment.
[Drawing 10]It is a system configuration figure showing the 2nd modification of a 1st embodiment.
[Drawing 11]It is an important section packet format figure of the 2nd modification showing transfer with a database client and 3D database server.

[Drawing 12]It is a system configuration figure showing a 2nd embodiment of the stereoscopic picture system concerning this invention.
[Drawing 13]It is a packet format figure showing transfer with the database client and 3D database server in a 2nd embodiment.
[Drawing 14]It is a format figure of camera ability information.
[Drawing 15]It is a flow chart which shows the operation procedures of 3D camera server.
[Drawing 16]It is a flow chart which shows the operation procedures of a database client.
[Drawing 17]It is a figure for explaining the principle of a stereoscopic vision indication.
[Drawing 18]It is a figure showing the actual image display of stereo image form.
[Drawing 19]It is a perspective view showing typically the conventional direct viewing type display which uses a lenticular lens.
[Description of Notations]
7 Communication control part
9 3D scene generation part
11 Data management part
15a and 15b Viewpoint setting out and changing part
52a52b data management part
62athe camera for 62b stereo photographing
63a and 63b Communication control part
68a 68b Communication control part
69a69b display device Research and Data Processing Department
72a and 72b Camera selecting part (photographing instrument selecting means)